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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,902	11/04/2003	Michael Zhuoying Su	1001-0263	7761

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EXAMINER

DIMYAN, MAGID Y

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/700,902

Applicant(s)

SU, MICHAEL ZHUOYING

Examiner

Magid Y. Dimyan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 20-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action pertains to the Amendments to the Claims, and Remarks, filed 28 June 2006. It is acknowledged that Applicant has amended claims 1 – 3, 13 – 15, 18 and 19. Claims 1 – 46 remain pending in this Application. However, claims 20 – 46 have been withdrawn from consideration, without traverse, due to a Restriction Requirement.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 – 15 and 18 – 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,463,570 B1 to Dunn et al. (hereinafter, "Dunn").

4. Referring to claims 1 and 18, Dunn discloses an IC comprising: (a) a speed sensing circuit (i.e., a ring oscillator - see Fig. 2A, Fig. 3A, block 302; col. 1, ll. 42 – 59); and (b) a first capacitive load (see col. 4, ll. 52 – 60; Fig. 2C) for characterizing at least one layer of an interconnect structure of the IC circuit (see col. 4, ll. 1 – 33), coupled to the ring oscillator (see col. 5, ll. 1 – 46; Fig. 2C), the first capacitive load formed by at least a portion of the first metal trace in the first metal layer, and a portion of the second metal trace in the second metal layer, the first and second layers separated by an insulating layer (as in claim 1), or the first and second metal layers are nonadjacent metal layers (as in claim 18). See Fig. 2B; col. 5, ll. 35 – 49 which disclose top to bottom

(i.e., different levels separated by insulating layers) metallization capacitance alternatively connected to the ring oscillator, as claimed.

Dunn teaches a predetermined set of parameters (i.e., parasitic/load capacitances) selected to sensitize the ring oscillator (speed sensing device) to variations in the fabrication process steps (which also includes interconnect structures) being verified (see col. 5, ll. 55 – 59).

But Dunn does not specifically teach a capacitive load being selectively coupled to the ring oscillator, as claimed.

Since using a selection process to characterize individual interconnect layers would enhance the characterization process of the layered interconnections, it would therefore be obvious to a person of ordinary skill in the art at the time of the invention to modify the teachings of Dunn in order obtain the same claimed invention.

5. Regarding claims 2 and 19, see (4) above, which also teaches having coupled capacitances generated by multiple metal levels (i.e. can be more than two metallization levels separated by insulating layers), as claimed.

6. As per claim 3, see (4) above, and in particular col. 5, ll. 40 – 49, which cites the nonadjacent metal layer element claimed.

7. Pursuant to claims 4 - 9, see col. 3, line 59 – col. 4, line 66, which cite the process variations that suggest the minimum (claim 4), maximum (claim 5) and nominal

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(claim 6) metal trace dimensions, having minimum (claim 7), maximum (claim 8) and nominal (claim 9) densities.

8. As for claim 10, see col. 4, ll. 34 – 56, which shows the oxide layer (low dielectric constant) insulator, as claimed.

9. As to claim 11, see (4) above which teaches the ring oscillator.

10. Referring to claims 12 – 15, see Fig. 2B; col. 4, line 34 – col. 5, line 49, which disclose the elements pertaining to the resistor and capacitors used with the speed sensing circuit, as claimed.

11. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn in view of Raza (U.S. Patent No. 5,943,488).

12. Dunn teaches an IC circuit that includes a speed sensing circuit with capacitive loads for selectively characterizing metal layers.

However Dunn does not teach using a selective connector that includes a fuse or an anti-fuse, as claimed.

Raza on the other hand, teaches a method and apparatus to generate mask programmable device that include links that can be configured as fuses or antifuses (see Raza – col. 6, ll. 46 – 60; col. 9, line 57 – col. 10, line 30).

Since using fuses and antifuses will facilitate the characterization of metal layers using speed sensing circuits because of the ease of selecting the capacitances of the various metallization layers, it would therefore be obvious to a person of

ordinary skill in the art at the time of the invention to combine the teachings of Dunn and Raza to obtain the same claimed invention.

Response to Remarks

13. Applicant's arguments in the Remarks filed 28 June 2006 have been fully considered but they are not persuasive. The Examiner has withdrawn the claim objections indicated in the previous Office Action. Because of Applicant's amendments to the independent claims 1 and 18, the Examiner has changed his rejections of claims 1 – 15 and 18 – 19 from a 35 U.S.C. 102(b) rejection anticipated by Dunn (U.S. Patent No. 6,463,570 B1) to a 35 U.S.C 103(a) rejection unpatentable over Dunn (see 4 – 10 above). Furthermore, the Examiner has provided a strong motivation for modifying the teachings of Dunn to obtain the same claimed invention. Furthermore, claims 16 and 17 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn in view of Raza (U.S. Patent No. 5,943,488), as indicated in (12) above and in the previous Office Action.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Magid Y. Dimyan whose telephone number is (571) 272-1889. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on (571) 272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Magid Y Dimyan
Examiner
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myd

08 September 2006

M7D

A handwritten signature in black ink, appearing to read "Vuthe Siek".

VUTHE SIEK
PRIMARY EXAMINER